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ABSTRACT

This paper analyzes data from the 1989-90 and 1995-96 National Postsecondary Student Aid Studies to examine the awarding of institutional need-based versus non-need grants to undergraduate students. The study examines how the use of the different types of scholarships has changed in recent years; characteristics of students who receive the grants; and whether race and gender are related to the awarding of grants. The sample for this study included full-time dependent students from four-year public and private research, doctoral, comprehensive, and liberal arts institutions; proprietary school students and students who received athletic scholarships were excluded. Bivariate analysis of the data demonstrated that white students were awarded a disproportionately large share of non-need grants in both study years, with their share increasing between 1989 and 1995. Multivariate analysis found that gender had little to do with the awarding of institutional grants; that race was more of a determining factor in the awarding of grants, with the effects differing by type of institution and region; that African Americans were more likely to receive non-need grants; and that in 1995 Hispanics and Asian Americans in private colleges were more likely to receive non-need awards than were other students. (Includes nine data tables. Contains 30 references.) (CH)

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The Role of Race and Gender in the Awarding of Institutional Financial Aid

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This paper analyzes data from the National Postsecondary Student Aid Study (NPSAS) to examine the awarding of institutional need-based versus non-need grants to undergraduate students. The purpose of the study is to determine: 1) how the use of these different types of scholarships has changed in recent years; 2) what are the characteristics of the students receiving them; and, 3) whether race and gender are factors related to the awarding of these grants.

This research was supported in part by grants from the Office of the Vice President for Research, University of Michigan (#8636), and the Association for Institutional Research, Improving Institutional Research in Postsecondary Educational Institutions grant program (#98-104). The opinions expressed here are those of the author.

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The Role of Race and Gender in the Awarding of Institutional Financial Aid

Financial assistance for individuals attending college has existed in this country almost as long as higher education itself. Holtschneider (1997), McPherson & Schapiro (1998), and Wick (1997) describe how scholarships were established in a number of colleges as early as during the colonial era and in the 19th century. The earliest scholarships were often awarded based on the academic merit of individual students, with some consideration given to financial need (Hauptman, 1990).

This practice was carried on into the 20th century largely by the private elite colleges and universities in the eastern part of the country. Recognizing the inequities of this system, and with no common method for determining financial need, many of the elite private institutions banded together in 1954 to establish the College Scholarship Service (CSS) as part of the College Entrance Examination Board. The CSS developed a formula for institutions to share to help determine the financial need of their applicants. With this action, most private institutions shifted their awarding of scholarships to a system based on family financial need.

This emphasis on financial need in determining eligibility for undergraduate scholarships was recognized by the federal government with the passage of the Higher Education Act of 1965, which implemented the Educational Opportunity Grant program (the precursor to Pell Grants). The states followed suit as state-funded scholarship funds grew after creation of the State Student Incentive Grant (SSIG) program. Created as part of the 1972 reauthorization of the Higher Education Act, the SSIG program provided matching federal funds to states that funded their own scholarship programs. The great majority of these state scholarship funds were awarded based on financial need.

Since the 1980s, however, the use of financial need as the basis for awarding scholarships has been eroding. Between 1982 and 1999 spending on need-based scholarships for undergraduates by the states increased 7.3% annually, while spending on non-need programs increased at a 12.7% annual rate (Heller, 2000). Colleges and universities have begun implementing new programs that rely less on need,

or on expanded definitions of financial need, as the key eligibility criterion. In addition, public institutions, which historically had relied on federal and state scholarship programs, began for the first time to award large numbers of scholarships from their own funds.

Public institutions historically relied on general state appropriations to hold down tuition prices, thus ensuring an affordable college education for all. Beginning in the 1980s, however, public tuition prices began to rise at rates far in excess of both inflation and growth in family incomes in the United States. While public tuition prices at both 4-year institutions and community colleges fell in real terms in the late 1970s, they rose at an annual rate of 4.3% and 3.2% respectively in real dollars in the 1980s, a period when median family incomes grew at a rate of only 1% per year (Heller, 1997a). The situation worsened in the first half of the 1990s, when real tuition rates at public institutions grew over 6% annually, and family incomes grew less than 0.5% per year (Heller, 1997a). In response to these changes, many of these institutions increased their spending on financial aid awarded from their own funds. Table 1 shows the increase in expenditures in three categories at public and private colleges and universities in the U.S. Between fiscal years 1990 and 1996, total expenditures per student increased less than 40% at both categories of institution. Spending on scholarships from all sources increased 69% at public institutions and 67% at private institutions, while spending on financial aid from institutional sources increased 105% and 92%, respectively.[1] The growth in institutional scholarship spending can best be understood when it is compared to the change in prices over this period. From 1990 to 1996, the Consumer Price Index increased 23%, indicating that real scholarship spending grew at over four times the rate of inflation (Bureau of Labor Statistics, 2000).

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[1] The IPEDS surveys do not collect data separately for undergraduate and graduate financial aid expenditures. However, there was little public or institutional policy change regarding the provision of financial aid for graduate education during this time period to account for such a large increase in spending (relative to overall expenditure increases). Thus, it seems fair to conclude that a major portion of the increase was due to increases in the provision of institutional financial aid for undergraduates.

Table 1: Change in Spending per Student (Current Dollars), FY 1990 to FY 1996

Institutional Control	Total Expenditures per Student	Total Scholarship Expenditures per Student	Institutional Scholarship Expenditures per Student
Public	35%	69%	105%
Private (non-profit)	33%	67%	92%
Total	35%	69%	98%

Source: Authors' calculations from National Center for Education Statistics, various years-a; National Center for Education Statistics, various years-b.

This study uses both descriptive statistics and logistic regression (a multivariate technique used with outcomes that are dichotomous in nature) to address these specific research questions:

- How did the awarding of need-based versus non-need grants from institutional funds change between the 1989-90 and 1995-96 academic years?
- What are the institutional characteristics related to the awarding of these grants?
- What are the socioeconomic characteristics of the students receiving these grants?
- How are race and gender, in particular, related to the awarding of these grants?

Related Research

There has been little recent empirical research on the use of non-need grants awarded from institutional funds. Over a decade ago Baum and Schwartz (1988) examined the use of merit aid in the students sampled in the High School and Beyond Survey of 1980. They found that while the majority of financial aid was still being awarded based on financial need, "at the margin, however, the system allocates aid to meritorious students" (p. 132). Ehrenberg and Murphy (1993) examined the provision of financial aid by elite colleges and universities in light of the Justice Department's investigation and subsequent lawsuit against the Overlap Group of colleges that met annually to compare financial aid awards for admitted students (*United States of America v. Brown University, et al.*, 1992). The authors concluded that "financial aid policies based solely on need at selective private colleges and universities in the United States are likely to be nearing their end" (p. 72).

Wick (1997) reviewed research conducted since the 1970s that examined the distribution of institutional aid between need-based and non-need components, but only one of these studies used nationally-representative samples of institutions and students (and very limited information was provided from that study). McPherson and Schapiro (1994, 1998) examined this trend, but their work examined the phenomenon at earlier time periods and with limited subsets of institutional types. Anecdotal stories about the financial aid efforts of individual institutions indicate that more of them may be using non-need aid as a way of attracting top students, or at the least, the practice is attracting more widespread media attention ("Cornell drifts closer," 1996; Gose, 1996; Shea, 1996). Yet researchers have yet to examine these questions with well-planned empirical research that goes beyond the anecdotes.

There is a broader base of literature on the influence of financial aid on students' decisions to enroll and persist in college. Reviews of much of this literature have been conducted over the last three decades by Heller (1997b), Jackson and Weathersby (1975), and Leslie and Brinkman (1987). Many of these studies have shown that institutional characteristics are a factor in determining the prevalence and nature of financial aid awards, including institutional control (public versus private), type (Carnegie classification), region of the country, tuition level, and status as a historically Black college or university (HBCU). Individual factors related to financial aid awards include socioeconomic status (race, gender, parental education level, family income) and scholastic achievement or aptitude.

Methodology

Data Sources

Data from the National Postsecondary Student Aid Study (NPSAS) surveys, conducted for the National Center for Education Statistics, were used in this study. NPSAS was conducted during four academic years (1986-87, 1989-90, 1992-93, and 1995-96). The 1989-90 and 1995-96 survey data were

analyzed for this study to track the changes over time in the use of need versus non-need financial aid.[2] The purpose of NPSAS is to provide information on how students across the U.S. pay for college, including data about financial aid awards. In each of the NPSAS years, data were collected for a stratified national sample of undergraduate and graduate students from over 800 institutions. There were approximately 47,000 and 41,000 undergraduate respondents for the two collection years, respectively, used in this study. To be eligible for inclusion in the NPSAS study, students needed to be enrolled in courses or programs leading to college credit, an award, or a degree.

In each of the NPSAS years, student financial aid and other information was collected from institutional records, as well as from surveys of students and their families. The over 800 colleges and universities were from nearly every institutional type: public, private non-profit, and proprietary; less-than-two-year, two-year, and four-year; and nearly every Carnegie classification.

The NPSAS surveys were designed to be nationally-representative of students attending postsecondary educational institutions in each year. Each utilizes a stratified multi-stage sample design, with the sample stratified by type and control of institution (first stage), and students within the selected schools (second stage). The estimated means and populations presented in the next section (and standard errors in the Appendix) were calculated taking into account the sampling weights and stratification schema in each of the NPSAS surveys. The multivariate analyses were also conducted taking into account the sample weights and stratification schema. For more information about NPSAS see the methodology reports produced for each survey year (National Center for Education Statistics, 1992; National Center for Education Statistics, 1997).

In certain instances, relevant institutional information not contained in the NPSAS datasets were obtained from the Integrated Postsecondary Education Data System (IPEDS) surveys, also maintained by NCES.

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[2] The 1986-87 survey did not have reliable measures for the awarding of need versus non-need aid. For clarity of presentation, "1989" will be used to represent the 1989-90 survey, and "1995" to represent the 1995-96 survey.

Measures

The NPSAS datasets contain numerous variables measuring need and non-need financial aid awards from a variety of sources (state government, federal government, private, and institutional). This study focuses on the variables contained in each dataset which measure need and non-need grants awarded from institutional funds. In each dataset, grants which are based solely on the determination of merit or other circumstances not related to financial need are categorized as institutional non-need grants. Such awards include grants and scholarships for academic, artistic, athletic, and other forms of merit. Institutional need-based grants are awards which are based on financial need, but which may include a non-need component.

The datasets also include important data about the institution at which a student is enrolled (e.g., tuition costs and institutional type) as well as information about students' financial status (e.g., dependency status and family income) and other measures of socioeconomic status. These measures will be used to determine if the trends in the awarding of need versus non-need grants vary by institutional type and family income.

The sample of students used in the present study included students from public and private four-year institutions. Students from proprietary schools were excluded since the use of financial aid at these institutions is less prevalent and generally motivated by factors other than those found at more traditional institutions of higher education. A further limitation placed on the sample was that only students from the research, doctoral, comprehensive, and liberal arts Carnegie classifications were included, excluding students from specialty institutions such as: theological seminaries; schools of art, music, and design; and schools with programs exclusively in the health professions or technology and engineering. Only full-time dependent students were included in the samples, as these students represent the population of interest for this study. This population of students (full-time, dependent, in four-year institutions) received 59% of institutional aid awarded by all postsecondary institutions in 1989, and 69% of the aid awarded in 1995.

The final limitation placed upon the sample was to exclude students who received an athletic scholarship, a form of non-need grant. Athletic scholarships differ from most other non-need awards in

that they tend to be larger and can drastically affect the other forms of financial aid received by a student. The use of athletic scholarships generally is limited to institutions who are members of Divisions I and II of the National Collegiate Athletic Association and is regulated by the NCAA and athletic conferences. Their inclusion in the analysis could mask changes in other forms of non-need aid. Consequently, it is desirable to eliminate these scholarships from an analysis of non-need awards.

Results

Bivariate Analysis

This section addresses the changes in the awarding of institutional need and non-need grants to students of different races and genders in 1989 and 1995. In general, the number of awards and the average size of awards increased over these years. Increases varied substantially by award type, as well as by students' race and gender.[3]

According to the NPSAS data, the total number of full-time dependent students attending four-year institutions in the U.S. decreased 3% between 1989 and 1995, from 4,003,992 to 3,892,092. Table 2 presents the number of grants, and the average size of each, for all students and for students from each racial group who received: 1) any type of institutional grant; 2) a need grant; or 3) a non-need grant.[4] In contrast to the decrease in total enrollment, the number of students receiving any type of institutional grant (shown in panel 1 of Table 2) increased 29% nationally, from 846,583 to 1,089,770, indicating that the proportion of all students who received an institutional grant increased during this period.

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[3] For information about institutional aid awards to students from different income groups, see Heller and Nelson Laird (1999).

[4] Students who received a need-based grant may also have received a non-need award, and vice-versa. The difference between the number of awards of any type, and the sum of the need and non-need grants, represents the overlap of students who received both a need and non-need grant. For the need and non-need panels, the mean amounts shown are for that type of grant only. For the panel of students receiving any grant, the means represent the sum of need and non-need grants.

The sample size of Native Americans included in the NPSAS surveys were too small to reliably estimate awards to these students. The "all races" totals do include Native American students, however.

Table 2: Institutional Grant Awards at 4-Year Institutions, by Race

	Number of Grants			Mean Grant Amount			Total Dollars Awarded
	1989	1995	Change	1989	1995	Change	Change, 1989 to 1995
Students Receiving Any Grant							
Asian American	43,435	87,876	102%	$3,589	$5,669	58%	220%
African American	74,606	96,257	29%	3,143	4,578	46%	88%
Hispanic	57,637	83,136	44%	2,320	3,772	63%	134%
White	666,000	801,934	20%	2,550	4,242	66%	100%
All Races	846,583	1,089,770	29%	2,649	4,345	64%	111%
Students Receiving Need Grants							
Asian American	36,344	81,934	125%	$3,646	$5,477	50%	239%
African American	59,887	79,488	33%	3,057	4,486	47%	94%
Hispanic	48,841	76,520	57%	2,250	3,575	59%	149%
White	483,373	666,700	38%	2,631	3,806	45%	100%
All Races	633,104	923,088	46%	2,709	3,994	47%	115%
Students Receiving Non-need Grants							
Asian American	9,701	8,405	(13%)	$2,408	$5,879	144%	112%
African American	20,735	22,950	11%	2,435	3,665	51%	66%
Hispanic	12,337	10,961	(11%)	1,935	3,648	89%	68%
White	254,716	227,292	(11%)	1,676	3,802	127%	128%
All Races	298,541	272,856	(9%)	1,766	3,840	117%	99%

Note: Standard errors for the mean grant amount estimates can be found in Appendix Table A-1.

The increase in the number of students receiving awards is attributable to a substantial increase in the number of need-based grants awarded, shown in panel 2 of Table 2. While the number of grants for students of all races increased 46% during this period, the number of need-based grants for Asian American students grew the most, and the number for African Americans the least during this period. The number of students receiving non-need grants (panel 3) decreased 9% overall, with all students other than African Americans seeing a decrease in the number awarded.

The pattern with respect to the size of the average grant awarded also differs by race. The mean need-based grant in 1989 ranged from a high of $3,646 for Asian American students to a low of $2,250 for Hispanic students. The increases in the average need-based award between 1989 and 1995 were fairly close for all the groups, ranging from 45% to 59%. For non-need awards, however, the range of increases over this period is larger. While the size of the mean non-need award to African American students grew only 51%, Asian American students saw a mean award increase of 145%.

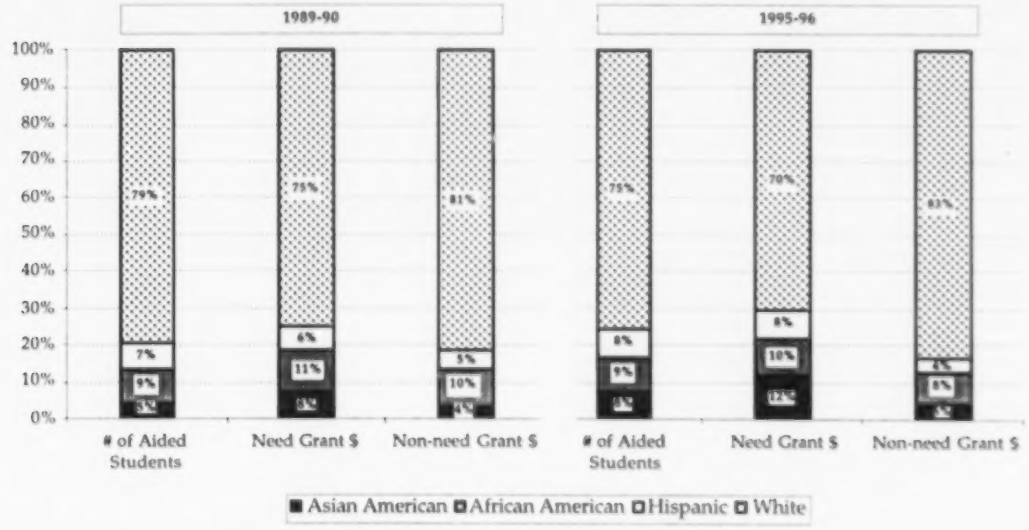
The last column of Table 2 shows the change in the total dollars awarded to each group for each type of grant. Overall, the amount of institutional aid awarded to these students increased 111% from 1989 to 1995, with the amount awarded to each race increasing from a low of 88% for African American students to 220% for Asian American students. This total increase closely approximates the increase in overall spending on institutional scholarships at all colleges and universities shown in Table 1, and as noted earlier, is over four times the inflation rate during this period. The amount of need aid grew a total of 115% during this period, while the amount of non-need aid dollars awarded increased 99%.

Increases in the numbers of award recipients and the average amount of the awards resulted in increased spending by institutions on these types of awards. Overall, spending at four-year institutions on need-based grants to full-time, dependent students increased 115% from approximately $1.72 billion in 1989 to $3.69 billion in 1995. Non-need grant spending increased 99% from $0.53 billion in 1989 to $1.05 billion in 1995.

The number of awards and total dollars awarded to each race are of course a factor of (among other things) the number of students enrolled in college. All other things being equal, one would expect White students to garner a disproportionate share of institutional financial aid dollars, since they represent the majority of all undergraduates. To better examine how the distribution of aid among the races changed between 1989 and 1995, you can examine the share of dollars awarded to each group in both years.

Figure 1 illustrates how the differences in the rates of change for the totals spent on each type of award changed the distribution of the dollars granted to the different racial groups. The first column of each panel shows the distribution of students who received any institutional grant award.

The second column shows the distribution of total need grant dollars, and the third column shows the distribution of non-need grant spending. Presented are the representation of students from each race among all institutional grant recipients, along with each income group's share of the total grant dollars of each type awarded.[5] White students, who represented 79% of all grant recipients in 1989, received 75% of the need-based grant dollars and 81% of the non-need grant dollars awarded. In 1995, when their share of the total number of aided students decreased to 75%, White students saw their share of the non-need grant dollars awarded increase to 83%.



Note: Columns may not sum to 100% due to rounding.

Figure 1: Distribution of Grant Spending, by Race

Table 3 presents the grant information for male and female students. For students receiving any type of institutional grant, females saw a larger increase in both the number of grants, as well as the average size, from 1989 to 1995. While the total dollars awarded increased 111%, grants to female students increased 137% in value. For need-based grants, the rate of increase in total dollars awarded

[5] The distribution is among the four races, excluding Native American Students.

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to female students (151%) was almost double that of male students (78%). Non-need grant dollars awarded approximately doubled from 1989 to 1995 for both male and female students.

Table 3: Institutional Grant Awards at 4-Year Institutions, by Gender

	Number of Grants			Mean Grant Amount			Total Dollars Awarded
	1989	1995	Change	1989	1995	Change	Change, 1989 to 1995
Students Receiving Any Grant							
Male	380,454	451,353	19%	$2,718	$4,145	53%	81%
Female	466,129	638,417	37%	2,593	4,486	73%	137%
All	846,583	1,089,770	29%	2,649	4,345	64%	111%
Students Receiving Need Grants							
Male	295,124	387,389	31%	$2,820	$3,796	35%	78%
Female	337,980	535,699	59%	2,612	4,137	58%	151%
All	633,104	923,088	46%	2,709	3,994	47%	115%
Students Receiving Non-need Grants							
Male	121,972	103,122	(15%)	$1,655	$3,884	135%	98%
Female	176,569	169,734	(4%)	1,843	3,813	107%	99%
All	298,541	272,856	(9%)	1,766	3,840	117%	99%

Note: Standard errors for the mean grant amount estimates can be found in Appendix Table A-1.

Figure 2 presents the share of institutional grant dollars awarded to male and female students. While females represented 56% of all aided students in 1989, they received 62% of all of the non-need aid dollars. By 1995, this advantage they enjoyed in the awarding of non-need aid was decreased, to the point that their share of the non-need dollars was only slightly higher than their representation among aided students.

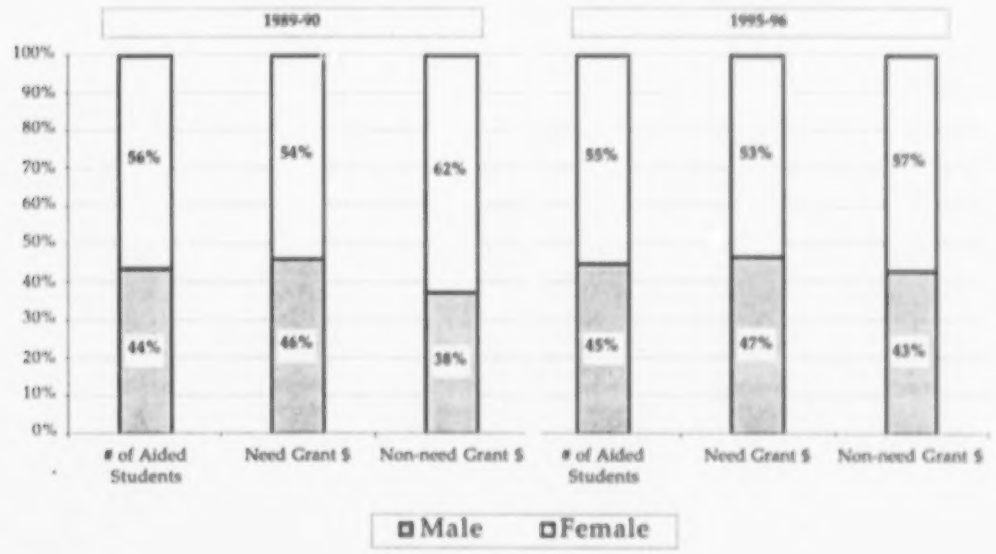

Figure 2: Distribution of Grant Spending, by Gender

Multivariate Analysis

The decisions institutions make in awarding financial aid are influenced by a number of factors, as described earlier. These include factors that are inherent to the institutions themselves, as well characteristics of the students. Logistic regression was used to allow for the consideration of a number of these factors in the financial aid decisions made by institutions. Logistic regression is an appropriate multivariate technique for this analysis because of the limited distribution of the outcome variables in the study, the institutional financial aid awards. For example, about three-fourths of the students in the 1989 sample and two-thirds in the 1995 sample received no institutional aid. Such a skewed distribution of the outcome variable violates the normality assumption of ordinary least squares regression (Kleinbaum, Kupper, & Muller, 1988). The outcome in this study is whether or not a student received an institutional grant, with separate analyses conducted for need-based and non-need grants in the 1989 and 1995 samples.

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The multi-stage nature of the sampling process (described in the Methodology section) requires an adjustment to standard logistic regression. As in ordinary least squares, standard logistic regression assumes that the observations in the sample are independent of one another. In the second stage of the sampling process, a number of students were drawn from each institution, thus violating the independence assumption. To account for this, the logistic regression models were fit using Huber/White estimators of variance, which allows observations that are not independent within institution (Huber, 1967; White, 1980; White, 1982). The sample weights were also used in the logistic regression analysis.

The analyses were conducted in blocks, with each block containing a series of predictor and control variables. The blocks and variables used are shown in Table 4.

Table 4: Logistic Regression Blocks and Variables

Block 1: Institutional Characteristics	**Block 4: Student Characteristics – Financial**
Control (public)*	Resident tuition status (in-state)*
Carnegie classification (Comprehensive I)*	Number in family enrolled in college
Historically Black college or university - HBCU (no)*	Family income ($ hundreds)
Tuition ($ hundreds)	Family size
Block 2: Other Financial Aid ($ hundreds)	**Block 5: Student Academic Performance**
Pell grant	College GPA (0 to 4 scale)
SEOG grant	
State need grant	
State non-need grant	
Other (private) grant	
Total loans (all sources)	
Parental (PLUS) loan	
Total work study	
Block 3: Student Characteristics – Demographic	**Block 6: Interactions**
Race (White)*	Control **X** race
Gender (female)*	Region **X** race
Mother's education level (HS graduate)*	Region **X** control
Housing type (off-campus, not with parents)*	
Year in school (first-time freshman)*	

Note: Items marked with an asterisk were included as a single or series of indicator variables (the referent group is shown in parentheses).

Table 5 shows the results of the logistic regressions for need grants awarded in 1990. Shown for each model are the Delta-*p* statistics, recommended by Petersen (1985) as a method for expressing the relationship between a unit change in a predictor and the estimated percentage change in the outcome.[6] The Delta-*p* statistic is calculated as:

$$\text{Delta-}p = \frac{\exp(L_1)}{1+\exp(L_1)} - \frac{\exp(L_0)}{1+\exp(L_0)}$$

where

$$L_0 = Ln\left(\frac{\bar{Y}}{1-\bar{Y}}\right)$$

$$L_1 = L_0\beta_x$$

For example, a Delta-*p* value of 0.025 indicates that a one unit change in the predictor is related to a 2.5 percentage point increase in the likelihood that a student would receive an institutional grant. The Delta-*p* statistic is shown only for those variables that were statistically significant at a level of $p \leq .05$, and only those variables that were significant in at least one model are included.

Also shown for each model are: 1) the number of observations in the sample, along with the weighted population size; 2) the log likelihood from the logistic regression; 3) the estimated population mean for the observations included in the model; and 4) a χ^2 test of the difference between the model and that immediately preceding it. Also shown is a pseudo R^2 statistic, calculated as:

$$Pseudo\ R^2 = 1 - \left(\frac{\text{Model log likelihood}}{\text{Intercept-only log likelihood}}\right)$$

The pseudo R^2 represents the proportion of the error variance reduced by a particular model in comparison to one that includes an intercept only.

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[6] The logistic regression coefficients and Huber/White standard errors for each model are available from the author.

Table 5: Logistic Regression Results (Delta-*p*) for Institutional Need-Based Grants, 1989

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
HBCU			-0.105	-0.103	-0.102	
Private institution	0.222	0.176	0.241	0.265	0.241	0.192
Research I				0.049		
Baccalaureate I	0.078	0.082	0.081	0.081	0.062	0.057
Baccalaureate II	0.082	0.060				
Tuition ($ hundreds)	0.0010	0.0008		0.0006	0.0007	0.0006
Pell amount ($ hundreds)		0.003	0.002			
SEOG amount ($ hundreds)		0.008	0.006	0.004	0.005	0.005
State need grant ($ hundreds)		0.005	0.005	0.004	0.003	0.003
Other grants ($ hundreds)		0.002	0.003	0.002	0.002	0.002
Total loans ($ hundreds)		0.004	0.004	0.003	0.003	0.003
Work study ($ hundreds)		0.009	0.008	0.007	0.007	0.007
Native American			0.131	0.129	0.138	
African American			0.130	0.115	0.146	
Hispanic			0.075	0.062	0.074	0.109
Male			0.018	0.023	0.038	0.039
Mother's education - Masters				0.042	0.038	0.041
Housing type – Campus housing			0.071	0.068	0.064	0.073
Family size				0.014	0.013	0.013
Tuition jurisdiction – non-resident						
Family income ($ hundreds)				-0.0002	-0.0002	-0.0002
College GPA					0.073	0.070
Private college – African American						-0.067
Private college – Hispanic						-0.087
Northeast – African American						0.142
Midwest – Asian American						-0.130
West – African American						0.336
Northeast – Private college						0.110
Midwest – Private college						0.100
Estimated population mean (% receiving aid)	0.186	0.186	0.185	0.185	0.182	0.182
Number of observations (sample)	17,480	17,480	13,311	12,838	11,813	11,813
Estimated population size	3,947,046	3,947,046	3,038,684	2,953,124	2,750,023	2,750,023
Pseudo R^2	0.118	0.189	0.214	0.232	0.240	0.249
Log likelihood	-7407.671	-3809.874	-5003.114	-4716.319	-4256.963	-4207.014
χ^2 test from previous model		1195.590	3613.520	573.590	918.710	99.900
Probability of χ^2		0.000	0.000	0.000	0.000	0.000

Note: Delta-*p* statistics are shown only for those variables whose coefficients were significant at a level of $p \leq .05$.

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The results shown in Table 5 confirm much of what we know regarding the awarding of financial aid. For example, in every model, students in private institutions are shown to be more likely to receive a need-based institutional grant, controlling for other factors. In the fully-specified model (Model 6), students in private institutions were 19.2 percentage points more likely to receive a need-based grant than were students in public institutions (18.2% of all students were estimated to receive a need-based grant). Students living in campus housing were approximately seven percentage points more likely to receive need-based aid than were students living off-campus (but not with their parents). Family income is shown to be inversely related to the probability of receiving a need-based grant. A $10,000 increase in family income reduces the chances a student will receive a need-based grant by two percentage points. Historically Black colleges and universities, which in the intermediate models are shown to be less likely to award need-based aid, are no less likely than other institutions once the interactions are included in Model 6. The likelihood of Hispanic students receiving a need-based grant is approximately 11 percentage points greater than White students across all types of institutions. Male students in general were approximately four percentage points more likely to receive a need-based grant than were females. The fully-specified model explains approximately 25% of the error variance compared to an intercept-only model.

Among the interesting findings in the fully-specified model is the role of academic achievement. As noted earlier, according to the NPSAS definition need-based grants are awards which are based on financial need, but which may include a non-need component. College GPA is shown to be positively and significantly related to need-based awards, with an increase of one point in GPA (i.e., from a B to an A) related to an increase of seven percentage points in the likelihood the student would receive a need grant.[7] Other interesting findings include the regional effects on the likelihood that students of certain races will receive a need-based grant. For example, African American students in the Northeast region of the country were 14 percentage points more likely to receive a need-based

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[7] The NPSAS surveys contain SAT or ACT scores for a sub-sample of students. These scores are highly correlated with college GPA, however (r= 0.3523, $p<.0001$ in 1989; r=0.3803, $p<.0001$ in 1995). Alternative models using SAT or ACT scores in place of college GPA were fit, with similar results estimated for SAT/ACT score as a predictor of the likelihood of receiving an institutional grant.

grant than were other students. Similarly, African Americans in the West were 34 percentage points more likely to receive such a grant.

Table 6 shows the results for non-need grants in 1989, when approximately 8% of all students received non-need awards. As with need-based grants, students attending private colleges and universities were more likely to receive a non-need grant than were students in public institutions, *ceteris paribus*. The role played by academic achievement in the awarding of non-need grants can clearly be seen. A one point increase in GPA is related to approximately an 18 percentage point increase in the probability a student would receive a non-need grant, more than double the effect of GPA on the probability of receiving a need-based grant.[6] Students beyond the first year of college were less likely to receive a grant.

The likelihood that an African American student would receive a non-need grant was almost 10 percentage points greater than that of White students in the fully-specified model. Asian Americans, African Americans, and Hispanics in private colleges, however, were less likely to receive non-need awards than were students in public institutions or White students in general. Gender appears to have no effect on the likelihood of receiving an award.

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[6] Models were fit that included an interaction between race and GPA, to see if the effect of academic achievement differed for students of different races. No effect (significantly different from zero) was found, however, for either need or non-need awards.

Table 6: Logistic Regression Results (Delta-*p*) for Institutional Non-need Grants, 1989

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Private institution	0.198	0.195	0.248	0.270	0.269	0.354
Tuition ($ hundreds)	-0.0004	-0.0004	-0.0007	-0.0006	-0.0007	-0.0004
State non-need grant ($ hundreds)		0.003	0.004	0.004	0.003	0.002
Other grants ($ hundreds)		0.001	0.001	0.001		0.001
Asian American					-0.029	
African American						0.096
Male			-0.021	-0.021		
Mother's education – GED			-0.055	-0.055	-0.053	-0.056
Housing type – Campus housing			0.027	0.026		
Housing type – With parents			-0.024	-0.025	-0.031	-0.024
Year in school – 2nd year			-0.014	-0.015	-0.020	-0.019
Year in school – 3rd year					-0.018	-0.018
Year in school – 4th year					-0.025	-0.024
Family size				0.005		
Family income ($ hundreds)				-0.0001	-0.0001	-0.0001
College GPA					0.180	0.185
Private college – Asian American						-0.045
Private college – African American						-0.055
Private college – Hispanic						-0.038
Western region						-0.039
Estimated population mean (% receiving aid)	0.079	0.079	0.083	0.083	0.083	0.083
Number of observations (sample)	17,480	17,480	13,311	12,838	11,797	11,797
Estimated population size	3,947,046	3,947,046	3,038,684	2,953,124	2,744,293	2,744,293
Pseudo R^2	0.061	0.066	0.094	0.102	0.178	0.210
Log likelihood	-4534.004	-4509.474	-3437.858	-3295.234	-2771.333	-2664.014
χ^2 test from previous model		49.060	2143.23	285.250	1047.800	214.640
Probability of χ^2		0.000	0.000	0.000	0.000	0.000

Note: Delta-*p* statistics are shown only for those variables whose coefficients were significant at a level of $p \leq .05$.

In order to examine how the awarding of institutional aid changed between 1989 and 1995, the same models were fit using the 1995 data. The results for need-based awards are shown in Table 7. An interesting point to note is the overall expansion in the use of institutional grants in 1995. While approximately 18% of students received need-based grants in 1989, over 26% were awarded them in 1995. Among the other changes in 1995 were the increased importance of being enrolled in a private

institution towards receiving a need-based grant (an increase from 19 percentage points in 1989 to 32 percentage points in 1995). In 1995, students in HBCUs were 13.5 percentage points less likely to receive a grant than other students. Hispanic students, whose likelihood of receiving a grant in 1989 was 10 percentage points greater than Whites, had no predicted advantage in 1995. Native American students, however, were 26 percentage points more likely than Whites to receive a need-based grant in 1995.[9] Male students, who were slightly more likely than females to receive a grant in 1989, had no advantage in 1995. The role of GPA in predicting the likelihood of receiving a need-based grant increased in 1995 to 11.6 percentage points. The overall predictive power of the 1995 models was similar to the 1989 models.

As in 1989, there were important regional effects in the later period. African Americans attending college in the Northeast were 31 percentage points more likely to receive a need-based grant than students in the South, a widening of the advantage found in the 1989 models. The advantage enjoyed by African Americans in the West in 1989 disappeared by 1995, however, while Asian Americans in the Midwest were predicted to have a likelihood of receiving a grant of 27 percentage points greater than students in the South and students of other races.

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[9] As described in note 4, the sample size of Native American students was very small. Even with the small sample size, however, the coefficient on this variable was significant. The 95% confidence interval on this coefficient would widen the predicted advantage of Native American students to a range of five to 45 points in 1995.

Table 7: Logistic Regression Results (Delta-*p*) for Institutional Need-Based Grants, 1995

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
HBCU	*-0.125*	*-0.145*	*-0.158*	*-0.164*	*-0.174*	*-0.135*
Private institution	0.202	0.194	0.262	0.269	0.266	0.317
Comprehensive II						-0.105
Baccalaureate II	0.123	0.102				
Tuition ($ hundreds)	0.0011	0.0008		0.0008	0.0009	0.0008
Pell amount ($ hundreds)		0.004				
SEOG amount ($ hundreds)		0.004	0.004			
State need grant ($ hundreds)		0.004	0.003	0.002		
Total loans ($ hundreds)		0.003	0.003	0.003	0.003	
Work study ($ hundreds)		0.009	0.008	0.007	0.006	0.006
Native American			0.335	0.290	0.329	0.255
Other race				-0.129	-0.142	
Mother's education – no HS diploma			0.156	0.159	0.160	0.121
Mother's education – less than 2 years of college			-0.070			
Mother's education – 1st professional degree			-0.188	-0.177	-0.178	-0.187
Mother's education - Doctorate			-0.142	-0.109	-0.114	-0.114
Housing type – Campus housing			0.065	0.076	0.079	0.091
Year in school – other 1st year			-0.075	-0.080	-0.084	-0.070
Year in school – 2nd year			-0.054	-0.052	-0.071	-0.067
Year in school – 3rd year			-0.060	-0.060	-0.087	-0.085
Year in school – 4th year			-0.085	-0.077	-0.098	-0.097
Year in school – other			-0.186	-0.186	-0.194	-0.194
Family income ($ hundreds)				-0.0002	-0.0002	-0.0002
College GPA					0.113	0.116
Northeast region						-0.139
Private college – Hispanic						-0.181
Northeast – African American						0.309
Midwest – Asian American						0.273
Northeast – Private college						0.184
West – Private college						-0.170
Estimated population mean (% receiving aid)	0.246	0.246	0.262	0.268	0.268	0.269
Number of observations (sample)	15,726	15,726	9,362	9,206	8,725	8713
Estimated population size	3,882,463	3,882,463	2,122,988	2,046,365	1,938,024	1,934,728
Pseudo R^2	0.118	0.190	0.201	0.214	0.235	0.257
Log likelihood	-7732.638	-7100.826	-4298.492	-4206.156	-3881.594	-3765.217
χ^2 test from previous model		1263.620	5604.670	184.670	649.120	232.750
Probability of χ^2		0.000	0.000	0.000	0.000	0.000

Note: Delta-*p* statistics are shown only for those variables whose coefficients were significant at a level of $p \leq .05$.

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Table 8 presents the results of the models of the awarding of non-need grants in 1995. As in 1989, African Americans enjoyed an increased predicted likelihood (7.3 percentage points) of receiving a non-need grant (across all types of institutions) compared to White students in the fully-specified model. African Americans in private institutions, however, were 6.1 percentage points less likely to receive a grant than were other students. While Hispanic students in general were 7.7 percentage points less likely to receive a non-need grant, Hispanics in private colleges were almost 19 percentage points more likely to receive a grant of this type. Asian Americans in private colleges enjoyed over a 21 percentage point increased likelihood of receiving a grant. Regionally, Asian Americans in the Midwest and Hispanics in the West were less likely to receive non-need grants than other students.

An interesting result from the 1995 models is the diminished role of academic achievement in the awarding of non-need aid compared to the earlier period. While in 1989 a one point increase in GPA was associated with an 18.5 percentage point increase in the likelihood of receiving a non-need grant, by 1995 this advantage had decreased to 12.7 percentage points. This advantage presented by academic achievement in predicting the award of a non-need grant was only slightly greater than the role of GPA in the models of need-based grants. As with need-based grants, there was an overall increase in the proportion of students receiving non-need grants, from approximately 8% in 1989 to 11% in 1995. The predictive power of the models in both periods was similar.

Table 8: Logistic Regression Results (Delta-*p*) for Institutional Non-need Grants, 1995

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
HBCU			-0.059	-0.066	-0.072	
Private institution	0.093	0.084	0.203	0.256	0.263	0.210
Research I	-0.040	-0.043		-0.047	-0.055	-0.051
Comprehensive II	0.128	0.135	0.126	0.119	0.115	0.099
Baccalaureate II	0.116	0.120	0.098	0.088	0.098	0.085
State need grant ($ hundreds)		0.001	0.001	0.001		
State non-need grant ($ hundreds)		0.005	0.005	0.005	0.004	0.003
Other grants ($ hundreds)		0.001	0.001	0.001		
Total loans ($ hundreds)		-0.001	-0.001	-0.001	-0.001	
PLUS loans ($ hundreds)		-0.001	-0.001	-0.001	-0.001	-0.001
Work study ($ hundreds)		0.001	0.002	0.002	0.002	0.002
African American					0.060	0.073
Hispanic			-0.063	-0.065	-0.063	-0.077
Asian American			-0.068	-0.067	-0.072	
Other race						-0.110
Male					-0.018	
Mother's education – Bachelor's Degree					-0.026	-0.028
Mother's education – 1st professional degree			-0.083	-0.083	-0.088	-0.088
Mother's education - Doctorate			-0.094	-0.095	-0.098	-0.096
Housing type - Campus housing				0.038		
Housing type – with relatives other than parents			-0.075	-0.074	-0.080	
Year in school – other 1st year			-0.052	-0.053	-0.057	-0.056
Year in school – 2nd year			-0.038	-0.036	-0.045	-0.046
Year in school – 3rd year					-0.032	-0.033
Year in school – Senior or graduated in 1995/96					-0.052	-0.054
Tuition jurisdiction – non-resident				0.106	0.111	0.096
College GPA					0.124	0.127

(continued on next page)

Table 8 (continued)

Private college – African American						-0.061
Private college – Hispanic						0.186
Private college – Asian American						0.214
Midwest – Asian American						-0.088
West – Hispanic						-0.075
Estimated population mean (% receiving aid)	0.097	0.097	0.105	0.106	0.110	0.110
Number of observations (sample)	15,726	15,726	9,362	9,206	8,725	8,699
Estimated population size	3,882,463	3,882,463	2,122,988	2,046,365	1,938,024	1,934,588
Pseudo R^2	0.096	0.107	0.157	0.164	0.207	0.228
Log likelihood	-4539.052	-4484.552	-2643.617	-2605.741	-2398.850	-2333.517
χ^2 test from previous model		109.000	3681.870	75.750	413.780	131.120
Probability of χ^2		0.000	0.000	0.000	0.000	0.000

Note: Delta-*p* statistics are shown only for those variables whose coefficients were significant at a level of $p \leq .05$.

Discussion

This study has examined the factors related to the awarding of institutional need-based and non-need grants in 1989 and 1995. It has focused on students often described as "traditional" college students – those attending 4-year institutions, full-time, and are still dependents of their parents. The primary question of interest is how race and gender are related to the awarding of these grants, and how those relationships changed between 1989 and 1995.

Overall institutional financial aid spending increased 111% during this period, a rate more than four times that of inflation and more than three times that of the overall increase in institutional expenditures per student. The increase in grant awards also outpaced tuition increases during this period, which averaged 66% at public 4-year institutions and 42% at private colleges and universities (College Board, 1999). Institutions apparently recognized the potential impact of rising tuition prices and increased institutional aid spending in response.

The bivariate analyses in this study demonstrated that White students were awarded a disproportionately large share of the non-need grant dollars in both years, with their share increasing

between 1989 and 1995. Female students, who similarly were awarded a larger share of the non-need dollars in 1989 (relative to their representation among all aid recipients), saw their share decrease in 1995.

In the multivariate analyses, logistic regression was used to untangle the many factors that help determine who is awarded financial aid. Table 9 summarizes the complex relationships described in the previous section. Shown are the racial and gender characteristics in each year (for each type of grant) that were associated with an increased likelihood of receiving a grant, and those associated with a decreased likelihood. One finding is that gender had little to do with the awarding of institutional grants during these years, controlling for the other institutional and student characteristics included in the models. Once the covariates were introduced into the equation, the

Table 9: Summary of Relationships Between Race and Gender, and Likelihood of Receiving Institutional Grants

	Need-based Grants		Non-need Grants	
	1989	1995	1989	1995
Positive Factors	Hispanics (11) Males (4) African Americans in the Northeast (14) African Americans in the West (34)	Native Americans (26) African Americans in the Northeast (31) Asian Americans in the Midwest (27)	African Americans (10)	African Americans (7) Hispanics in private colleges (19) Asian Americans in private colleges (21)
Negative Factors	African Americans in private colleges (7) Hispanics in private colleges (9) Asian Americans in the Midwest (13)	Hispanics in private colleges (18)	Asian Americans in private colleges (5) African Americans in private colleges (6) Hispanics in private colleges (4)	Hispanics (8) Other race (11) African Americans in private colleges (6) Asian Americans in the Midwest (9) Hispanics in the West (8)

Note: The percentage point size of the effect is shown in parentheses.

advantage enjoyed by female students in receiving non-need awards disappeared. Only for need grants in 1989 was gender a factor, when males were four percentage points more likely to receive a grant than were females. This advantage disappeared by 1995.

Race was more of a determining factor in the awarding of institutional grants, and many of those effects differed by type of institution and region of the country. African Americans in general were more likely to receive non-need grants in both years, and this effect was particularly pronounced in public institutions (since African Americans in private institutions were *less* likely to receive non-need awards). Hispanics in private colleges were less likely than other students to receive either type of award in 1989, and need awards in 1995. While Hispanics in general were less likely to receive non-need awards in 1995, those in private colleges saw a shift in their preference between 1989 and 1995. While in 1995 Hispanics in these institutions were less likely to receive a non-need grant, by 1995 they were more likely than other students to receive one (though Hispanics in the West were less likely to receive a non-need grant). African Americans in the Northeast region of the country were more likely to receive need-based awards, and their likelihood of receiving such a grant increased greatly between 1989 and 1995. In 1995, Hispanics and Asian Americans in private colleges were more likely to receive non-need awards than were other students.

The question of how these awards are made is complex. In their awarding of need-based institutional aid, most colleges and universities have historically followed the federal needs analysis rules for determining eligibility for financial aid.[10] Colleges and universities have much more flexibility in the awarding of non-need aid, however, and many use non-need aid as a marketing tool to attract certain types of students to their institutions (and to keep them enrolled once they matriculate). The 1989 data pre-date the *Podberesky v. Kirwan* (1991/1994) court case at the University of Maryland and *Hopwood v. State of Texas* (1994/1996) case, both of which restricted the ability of public colleges and universities in the 4th and 5th federal court districts to use race in admissions and financial aid decisions. Financial aid decisions for the 1995/96 academic year were made in the midst of both

[10] Many of the elite private institutions do ask students for additional financial information regarding their parents' income and assets, and this information is taken into account in determining eligibility for institutional need.

Podberesky (which was being appealed to the Supreme Court by the University of Maryland in the spring of 1995) and *Hopwood* (which was between the federal circuit court decision and the federal appeals court decision). Thus, it can be argued that these two cases should have had little impact on the decisions institutions made regarding the use of race in financial aid in the winter and spring of 1995.

Since the fully-specified model (Model 6) includes academic achievement as a control (along with all the other factors listed in Table 4), one conclusion that can be drawn is that the effect of race on the likelihood of receiving a non-need grant is a signal of institutional financial aid policies. If true, then the results here would indicate that African Americans in both 1989 and 1995 were targeted for financial aid awards, relative to White students, with the advantage decreasing three percentage points between the two years. Hispanics overall were disadvantaged relative to White students in 1995, though those in private colleges did receive a big boost in their likelihood of receiving a non-need grant.

These conclusions must be considered carefully, however. One possibility for the relative advantage received by African Americans is that these students were more likely to have some unmeasured characteristic that colleges valued in their awarding of non-need grants. In addition and as noted earlier, the need-based grants as defined in the NPSAS surveys can contain an element of merit. This may explain why Hispanics, who in addition to African Americans and Native Americans have been historically under-represented in four-year colleges and universities and have often been the targets of affirmative action efforts, were more likely to receive a need-based award in 1989. Institutions may be using different scholarship programs, which are often separated into those with a need component and those without, for attracting certain types of students.

Additional research could further explore the complex relationships uncovered in this study. One method of testing these findings would be to examine the specific scholarship programs that were operated by different types of institutions during these years, to try to determine whether students from certain racial groups were targeted for particular types of financial aid awards.

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Appendix

Table A-1: Standard Errors for Tables 2 and 3

	Standard Error of Mean Grant Amount	
	1989	1995
Students Receiving Any Grant		
Asian American	$433	$646
African American	266	351
Hispanic	338	378
White	123	188
Male	163	180
Female	130	271
All Students	138	199
Students Receiving Need Grants		
Asian American	$486	693
African American	312	378
Hispanic	368	360
White	145	202
Male	193	183
Female	158	316
All Students	167	220
Students Receiving Non-Need Grants		
Asian American	$387	723
African American	280	558
Hispanic	423	636
White	93	223
Male	102	276
Female	115	210
All Students	99	213